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ABSTRACT

A case study investigated the emergence of language and language concepts in a bilingual child, a girl aged 16 months to 6 years, 7 months. Observations were made by the child's parents and relatives in the child's home where the mother spoke Finnish and the father English. The report summarizes developments in phonology, morphology, word-level semantics and reference, and interpersonal discourse and offers illustrations for unelicited data and observation. It is proposed that metalinguistic conceptualization occurs when a cognitive problem is encountered. The role of bilingualism in the process of concept formation is examined. The data are especially rich in phonology and a correspondingly detailed analysis of this area is made. It is concluded that overt linguistic awareness was considerable and was focused on the word in grammar, the distinctive feature in phonology, on conversational interaction in discourse, and homonymy in semantics. Syntactic awareness was not apparent. Bilingualism appeared to contribute directly to concept formation in the areas of phonology, morphology, and the distinction between word and referent. Additional patterns are examined. (Contains 49 references.) (MSE)

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Concepts of Language in a Finnish-English Bilingual Preschooler.

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CONCEPTS OF LANGUAGE IN A FINNISH-ENGLISH BILINGUAL PRESCHOOLER

On the basis of observations in the home setting, a study was made to determine how concepts of language and language behaviour emerge and develop in a female Finnish-English bilingual from 1 yr 4 mths. to 6 yrs 7 mths. This paper describes those parts of the study dealing with phonology, morphology, word level semantics and reference, and face-to-face discourse, and includes numerous illustrations from the extensive observational, unelecited data. Various explanations are proposed on the hypothesis that (meta)linguistic conceptualisation occurs when a cognitive problem is encountered. The role of bilingualism in concept formation is examined. The data is especially rich in phonology and a correspondingly detailed examination of this area is made. It is shown that awareness is concentrated on hierarchically organised distinctive features, which are seen to be conceptualised as a byproduct of both interlingual and intralingual problems of perception or articulation.

Keywords: concepts bilingual Finnish cognition preschooler phonology metalinguistic

CONCEPTS OF LANGUAGE IN A FINNISH-ENGLISH BILINGUAL PRESCHOOLER

Introduction

This examination of the spontaneously expressed language-related concepts in the first five years of life, is based upon a long-term study of the development of a child's concepts of language and language behaviour which appears to have no close parallel among anglophone studies of children's linguistic development.

The most nearly related study is probably Slobin (1978). Slobin's and the present study differ from other studies of language awareness known to me in containing **both** observational reporting **and** in dealing with language-related concepts in a preschooler.

The differences between Slobin's study as reported and the present study are however greater than their similarities: Slobin's paper is a short, informal, only slightly systematised account of observations, interspersed with deliberate, informal experimentation and which lacks discussion from a concept developmental point of view. The present study is based upon an exhaustively systematised account of a much wider range of data than was exemplified by Slobin and covers the full period from the first words to commencement of schooling, using almost exclusively spontaneous (unelicited, unprompted) observational (non-experimental, unprobed for) data.

Furthermore, Slobin's subject was not a truly bilingual child but

one exposed actively to foreign languages during residence in various countries: thus the **context** of his observations differs from the present author's.

LINGUISTIC AWARENESS versus METALINGUISTIC AWARENESS

In the abovementioned paper, Slobin does not categorically distinguish his central topic, which I take to be the development of **linguistic concepts**, from another related topic, the development of **metalinguistic awareness** or **skills** when he says (Slobin, 1978:45): "One can distinguish levels of metalinguistic capacity, from the dimly conscious or preconscious speech monitoring which underlies self-correction" (due to **metalinguistic** awareness in my view), "to the concentrated, analytic work of the linguist" (due to mature **linguistic** conceptualisation in my view). Rather than insist upon the distinction implicit in the titles of the two books in the Springer series "Language and Communication" ("The Child's Conception of Language" and "Metalinguistic Awareness in Children") I would subsume *METALINGUISTIC AWARENESS*, as it has been understood in the literature, under *LINGUISTIC AWARENESS*, and speak of the child's LINGUISTIC DEVELOPMENT, by which I mean the acquisition of linguistic or language-related concepts, in contradistinction to her LANGUAGE DEVELOPMENT, which I take to subsume language acquisition and language learning.

The literature concerned with early language awareness speaks

of both "metalinguistic awareness" and "metalinguistic skills". These attributes of children during early and middle childhood have been researched fairly extensively in the last 30 years, and especially during the 80s. However, individual studies have, firstly, been restricted to certain aspects of language, especially the word (e.g. Bialystock, 1985) the phoneme (e.g. Nesdale et al., 1984) phonology (e.g. Fox and Routh 1975) among others; secondly, have been problem-oriented, being concerned with the acquisition of reading skills; and, thirdly, have employed experimental methods, typically with many-subject cross-sectional designs. The foregoing points are true both of the psycholinguistic research of the 70s and 80s and of the psychopedagogical research of the 60s.

METALINGUISTIC: a redefinition

Chaney (1989) has observed that what the range of metalinguistic skills mentioned in the review of the literature in Tunmer et al. (1984) have in common is "the ability to separate language structure from communicative intent". In my experience, this definition goes too far in positing a unitary ability, and not far enough, in referring only to structure. I find the definition of Tornéus in her introductory work (1991) more congenial. She states (p.9) that METALINGUISTIC means that "attention is paid to the meaning, form and function of words" (my translation of the Finnish translation), and this I would regard as an approximative definition of LINGUISTIC as I propose to use this term in LINGUISTIC

DEVELOPMENT. The developing awareness of language behaviour, which I include under LINGUISTIC DEVELOPMENT eventually merges with general social awareness and conceptualisation.

Summary

To recapitulate: what I have been concerned with is the manner and the extent of insight acquired both into language itself and into language behaviour by a pre-school aged child, who also happens to have developed as a bilingual, during the course of ordinary interaction with her parents and other adults. I have doubts as to whether the term METALINGUISTIC is an appropriate one. What I am in fact dealing with may rather be termed the LINGUISTIC DEVELOPMENT of the child, as distinct from her LANGUAGE DEVELOPMENT. By LANGUAGE DEVELOPMENT, I mean both language acquisition and language learning, and by LINGUISTIC DEVELOPMENT I mean the way in which a child obtains an understanding of language and language behaviour.

Implicit and Explicit Awareness

A further problem which I have with the term METALINGUISTIC is that, in the literature on experimental studies, as applied to **behaviour** it appears usually to be categorical. I incline rather to the view taken by Slobin (quoted above). Feryal Yavas (1988:40) also writes: "It seems clear that the linguistic

process responsible for metalinguistic activity and that responsible for communication differ considerably. It is possible to view metalinguistic and communicative activities as prototypical extremes of a scale of linguistic behaviour... involving greater or lesser degrees of deliberateness" (my translation from the Portuguese). I also view communicative and (meta)linguistic behaviour (as distinct from conceptualisation) on a scale. Consequently, I suggest that, **within** the set of utterances which we deem to be evidence of LINGUISTIC DEVELOPMENT, we can discern degrees of implicitness (or, equivalently, explicitness). I have therefore placed on record many of the indications of implicit awareness in my subject's development of linguistic concepts. However my assessment of **degrees** of implicitness and explicitness, where indicated, remains intuitive. Although I attribute these degrees of implicitness to the child's concepts, I do not thereby intend that there is a continuity between conceptualisation and behaviour: the latter is observed, but the former is inferred.

Aims of the Study

The linguistic development I have followed in this case study comprises the first phases of the development of linguistic concepts which may eventually be fully acquired by any adult possessing sufficient linguistic awareness, and which for adult linguistic scientists have generally accepted names. One can with logical justification dispute whether the adult concepts are in

fact descendants of the concepts which the child is acquiring, more particularly because acquisition is not far advanced in the phases which I have studied. However, unless it can be shown that the phonological, morphological, semantic and other linguistic concepts of adults who are not linguistically trained have some totally different source, or that the premises of genetic psychology are false, the assumption that the child is indeed in the process of acquiring these concepts can be allowed to stand. One might also dispute whether non-linguistically trained adults necessarily acquire some of these concepts. I suggest that there is little doubt that all English and Finnish speaking adults of normal intelligence acquire the basic semantic, discoursal and phonaesthetic concepts discussed below, although of course the adult form of these concepts will still be less internally differentiated than the corresponding concepts of lingustic scientists, and may also be less explicit. As regards minimal distinctiveness, the suggestion is less clearly warranted. It is at least probable anyway that non-literate adults have some version of this concept, and virtually certain that adults literate in an alphabetic script have some version of it. For further discussion see below.

Subject and Method

My subject is a female child in her home setting, where basically, the mother spoke Finnish, which I shall call L1, and the father, English, which I shall call L2, with the child. The

parents normally spoke English with each other. Most observations outside Finland were made at the homes of close adult kin during relatively short visits to England. Observations were recorded by both parents in diary form from 1;4 (1 year 4 months) to 6;7 (6 years 7 months), that is, until just before she started school. At the beginning most utterances were recorded, but from about 2;8 (mainly) those utterances were recorded which were related to awareness of language.

Part 1: Data

Development of Phonological Awareness

Phonaesthesis and Voice Qualification

The precursors of many phonological concepts which are discernible in the data include both explicit and implicit awareness of phonaesthetic qualities in words, and of voice qualification. Phonaesthetic qualities were commented upon 4 times between 3;3 and 4;9, the first and third examples being highly implicit and the second and fourth highly explicit. An implicit example is an AUTOLOGISTIC (NB I replace NEOLOGISTIC with this term throughout this article) Finnish-based verb *flefottaa* which meant the flying of a butterfly. An explicit example occurring at 4;9 was: *Is plug really töpseli in Finnish? Töpseli is a soft word when one says it, it feels soft.* Voice qualification (for this term, see Crystal, 1969:133) was remarked upon at 3;11 and 4;0 years: *In a Paddington voice, a growly voice* which is of course

a quotation and counts as highly implicit, and *Sometimes I talk boredly,* which is pretty certainly an original comment.

Minimal Contrast

One phonological concept has a long and interesting development which occurs mainly during the period 1;6 to 5;2. This is the concept of minimal distinctiveness. It is by far the most salient among the phonological notions which can be seen to be emerging. Examples of vocalic contrasts and of consonantal contrasts in L2 are more explicit than the earlier examples of consonantal contrasts in L1, from which I suggest we can conclude that there is a development of the general concept of minimal contrast. The fact that the two missing positions of contrast are vowel initial and consonant final may be due to what is often asserted to be the case, that perception of phonological structure proceeds on the basis of consonant-vowel sequences. The fact that there are as many word-medial as word-initial examples of consonants indicates that the rhymes and jingles to which the child was exposed were not a decisive influence; what the decisive influence most probably was will be suggested below where a comprehensive explanation for the data outlined in this section is proposed.

At 3;8 there occurs a striking example of a phonological translation which would have done justice to an adult translator. A Finnish sentence uttered by the child at daycare *Kato kuin ihanat*

pilvet is misheard by the caregiver as *Kato kuin ihana ilves*, that is 'Look what lovely clouds' was heard as 'Look what a lovely lynx'. She explained the mishearing to her father as *I said clouds and I heard cows*. It was perhaps not just good luck that the translation, though no doubt based on the shared semantic features of lynx and cow, should also preserve the misconstrued consonants in the correct, that is, initial and final, positions, while the correctly construed medial vowel is also matched. In my estimate, this achievement is, among other things, a culmination of the gradually developed understanding of consonant contrasts in each language separately.

At 3;8.28 the concept of minimal contrast appears to become completely explicit when she says *Pilmi on melkein kuin filmi; pilmi on melkein kuin pilvi* ('pilmi is almost like filmi; pilmi is almost like pilvi'). However this is followed by *eit(?) on melkein kuin pleit; pöt(?) on melkein kuin pöytäliina*, indicating that what is being conceptualised is, certainly, contrast between partially similar words, but not **minimal** contrast as such. Below I propose that the first concept acquired is not in fact phonemic contrast but **sub**phonemic contrast, that is, the contrast between phonological features.

Development of Morphological Awareness

Suffixation

Development of awareness of morphology is relatively slight compared with that of phonology, but nevertheless interesting. Relatively explicit awareness of suffixation had appeared as early as 3;1, as evidenced by an L2 example, in which A says: *We are sweeters, Daddy*. Her father replies (not as an attempt at elicitation, but because of failure to understand): "Why are we sweeters?" and A answers: *Because we are going to eat sweets*. This example shows (a) productive use of an agentive suffix (denominal like footballers, not deverbal like runners) and (b) explicitation of the suffix's meaning.

Suffixation and Transparency

Only much later, at 5;7, a fully explicit reference to suffixation occurs in L1, after she has produced an autologism, *vakkunakuuku: vakkunakuuku means plates. Kuuku* (hesitation pause, then) *is the place which comes at the end.* (i.e. the plural marker). At 5;9 there occurred a further, more complex example: *Ettutimaalu means play with little lego. Little is jot. Just little, but little lego is ettuti. In that part one doesn't even say that jot*. The child has a clear preference for transparency, which facilitates transfer between the two languages. However, an invented morphological opacity is nicely illustrated by the above example of autologistic derivation. I would explain this example as an exemplification of the correspondence between noun

and adjective + noun. This particular opacity must have become salient for her because of the family habit of referring to "Lego" bricks as "Little lego" to distinguish them from "Duplo" bricks, the corresponding larger bricks for younger children.

Compounding

Awareness of compounding was quite explicit at 3;8, when she cites an L1 word in an L2 remark: *In sujapuku there's suja and puku. Write sujapuku.*" (the compound 'suojapuku', snowsuit, consists of 'suoja', protection, and 'puku', suit.). A little later, at 3;10, she noticed that a word form might contain another, unrelated, word form, asking whether the 'fin' in 'dolphin' is really 'Finn'. The reason for the salience of this particular instance of partial homonymy may be that 'dolphin' in L1 does not contain 'Finn' and that 'dolphins' (delfiinit) had only been experienced in an L1 context. Subsequently it was probably interlingual interference which disturbed recall of the L2 word 'dolphin'. Primarily, the question about 'dolphin' appears to be aimed at determining whether dolphin could be bimorphemic. The word appears to be partially transparent, and thus evokes the persisting desire for transparency.

The two types of morphological awareness I have dealt with so far have implicit precursors, and overall there are more than twenty examples which indicate implicit awareness of various aspects of morphology. Examples of the above mentioned aspects of morpholog-

ical awareness are interwoven over the period extending from 2;7 to 4;8. There also occurred an isolated and surprising example of the awareness of word-class at 3;10, when she distinguished, in L1, between 'people words' and 'stuff words' *(ihmissanoja ja tavarasanoja)*.

Prefixation

Prefixation enters the child's awareness at 4;4 and 4;11 in L1 examples and at 5;8 in an L2 example. In fact, however, L1 contains no true prefixes and is very rich in suffixes. It is of course possible that these facts explain the greater and earlier awareness of suffixation. On the other hand, Slobin's maxim for language acquisition "pay attention to the ends of words" implies a universal implicit primacy for suffixation, which is far more frequent across languages than prefixation.

Development of Semantic Awareness

The Nature of Semantic Concepts

I shall turn now to semantic awareness, which I take to be concerned with two distinct sets of concepts. One of these is the set of concepts related to the linguistic sign, especially the concept of the referent and of the relation between sign and referent. The other is the set of concepts of relations between

signs (semantic relations).

I will describe first the development of concepts of the major semantic relations, that is, synonymy, homonymy and hyponymy. The fourth major relation, antonymy, did not appear at all during the period studied.

Synonymy

Synonymy is a very important property of language. With one exception, this child's first awareness of synonymy appears at about the same time as the switch from thematisation of referent to thematisation of word in statements about equivalence, which I shall discuss further in the next section. At 3;8.11 she says she will call herself Beaky instead of Myfanwy, and on being told at 3;8.13 that plane is the same as aeroplane, she responds *We say plane and aeroplane*. At 4;2 however she rejects the idea that two Finnish words can be synonymous, on the grounds that one of them is more transparent than the other *(lappu* and *iltti* for the tongue of the shoe: *lappu* is a known form which has appropriate semantic features for the new application). At 4;2.29 she realises that cross-language synonymy (or "equivalence") may be associated with similarity of form, when she infers that Klaara and Claire are the same name. The examples I have just given of intralingual synonymy are hardly prototypical for this concept,

although fairly explicit. I would suggest that that what we have here are little more than precursors of a synonymy concept. The very early example which I referred to above as an exception occurred before she had begun to refer to words in the theme of her utterances, and cannot therefore be viewed as an example of awareness that two words have the same, or a similar, referent, but only as an awareness that a single referent can be known by two names. These findings therefore confirm the conclusion of Ellen Markman et al., who, according to George Miller (1991), "have shown that young children tend to assume that each object has one and only one name". It is striking that the conclusion of Markman et al. also appears to hold true in a case of a bilingual.

Homonymy

In contrast to synonymy, there is good evidence for awareness of homonymy, that is, the converse of synonymy. There is also evidence that specific input may have contributed (see below). A very early apparent example should be excluded on the same ground as the early example of apparent synonymy was excluded, viz. that she was not yet thematising words, but referents. Later, at 4;0.4. she asks her father what *veräjä* means in Finnish. When father says it means 'gate', she replies that it means something like a crow but it may mean gate as well. At 4;8.2 she asks explicitly about the word which sounds as */bi:/* but what she has in mind here are the BE-verb and the insect bee,

which on one definition of terms would be an instance of homophony, not homonymy, since the word categories are different. At this point the mother provided input, which was not recorded in detail, about words which have the same sound but different meaning. Subsequently, at 4;9.5, the child discussed with her mother a word in L1 (*uni*) which has two distinct equivalents in L2 ('sleep' and 'dream'). The child remarks *Strange that there's uni and uni*. At 4;7.9 she explicitly noted the homonymy of *lehti* ('newspaper' and 'leaf') in L1, and at 5;6.9 she observed in L1 that the word vuori is two words: *this here in the snowsuit* ('lining') *and then rock. If a rock is very big it's a vuori* ('mountain'). At 5;8.29 she said in L2 of a medal worn by a storybook character: *That's got a number one on it because she won it. No. Not really*. Thus by the end of the sixth year she was explicitly aware of homonymy in both languages. In fact she gave a short account of the subject in L1 just before starting school: *If there was a foreigner it would certainly be funny that it* (the word *kieli* meaning 'tongue' and 'language') *means two things, even if he lived in Finland and knew Finnish, even so it would seem funny*.

While there was input at one point from the caregiver which no doubt contributed to the development of this concept, the input itself was stimulated by the child's awareness of a homophonic word. The concept of homonymy is clearly better developed than the concept of synonymy. We discuss this point further below.

Hyponymy

The third semantic relation, hyponymy, and its converse hyper(o)-nymy, is rather less well represented than homonymy. As early as 1;6 there appears to be a precursor of the understanding of the subordinate relation which is purely receptive: the mother says in L1 *Babies can't do this, only grown-ups,* and she responds: *Mummy, daddy*. The first explicit remark, referring to an improper class inclusion relation, occurs at 3;0.28 in L1, when she says *Uncles are boys and boys are boys too*. The next example occurs at 4;10.7, when she says to her father who just used a referentially vague expression: *That is not a thing it's an X,* (X was a specific name). Here she appears to reject the hyper(o)nym as overgeneralised reference. At 5;1 she wants to repair her own statement in which she has said *win the target* instead of *win the target shooting*. Miller (1991) cites Waxman and Gelman as having shown experimentally that the concept of superordination is already acquired by 3 year olds. I suggest that superordination and subordination, as reflected linguistically in hyper(o)nymy and hyponymy, may be quite unproblematic at an age when the child is capable of talking about them. The examples quoted above in fact appear to derive from a second-order problem with superordination, such that the child experiences a mismatch
(e.g. impropriety, overgeneralisation, unfamiliar metonymy) between the language input or output and an already developed concept of class inclusion. On the hypothesis that concepts are always generated by an encounter with a problem, we can then

explain the restricted evidence for a concept of hyponymy or hypernymy.

Development of Awareness of Sign and Referent

The development of the concept of sign (that is, verbal sign) and referent is characterised by a thematic shift in mid-course of development. At first the theme of the child's remarks and questions is the referent. For example, questions are of the form "What is its name?" and not "What does that word mean?" and statements are of the form "That is a table" rather than "A table is that". The child's lack of interest in words as themes is underlined by the fact that the parent's question of the form "What is L1 word in L2?" at 2;2 was not understood by her. The word (or name) as theme first occurs at 3;8.29 and is frequent after that. It is difficult to explain the occurrence of this shift, and more particularly, to explain why it occurs at this particular point in her development. One possibility is, that since caregivers typically use words in addressing children which they believe the children already know, that the shift to word as theme of utterances may be due to a problem of understanding which appears only when the child begins to attend to words **not** addressed to her personally. But I have no evidence that this was so, in the present case.

The development of the concept of referent, prior to the thematisation of words, has two internal stages. At the first stage, the

thematic referent (topic as referent) is not expressed but is recoverable from the context. This accords with the observations and analysis of Elizabeth Bates (1975:96 et seq.) concerning presupposition. At 1;9.5, looking at a picture, the child says *Lynx. Ilves*. At this time, L2 words rarely appeared except as matching equivalents of L1 words, or as direct imitations. However, both words which name the animal in the picture are here not themes but rhemes, and the picture itself is the referent and unspoken theme. Utterances of this sort are thus no more than the very first precursors of those later utterances which explicitly indicate the sign - referent relation.

The BE-verb, which is essential to explicating identity relations, first appeared at 1;8.26, when she asked *Missä B on?* ('Where is B?') but its first appearance in a statement of equivalence was at 2;0.9, when she said *House on koti* ('House is koti'). At this point there had been no input concerning relations between words in L1 and words in L2. This example marks the internal stage 2, at which the referent is explicit. Thus, what she is apparently saying here is not that the word *house* is equivalent to the word *koti*, but that the referent of *koti* also has the name *house*. At 2;1.23 she received relevant input when her mother told her that objects which she preferred to name in one language also had names in the other language.

At 2;1.29, after the words haarukka and fork were used at mealtime, she said *Fork on haarukka* ('Fork is haarukka'). At 2;1.30 there was further input from her mother, who told her "Animals

say one thing, Anna says two things." On the same day there is evidence of non-immediate recall of an L2 equivalent: *Kaulin... se on rollingpin* ('Kaulin... it's (a) rollingpin') I conclude from the physical presence of the referent in both these examples that the referent is the theme, even if appearances otherwise suggest that it is the word which is being thematised. I grant, however, that the evidence is ambiguous and that my view is predicated on the assumption that an understanding of the direct relation will precede an understanding of the indirect (intraverbal) relation; the overall evidence is consistent with this view, according to which the first noun stands for the referent, and the second, non-thematic, noun is then asserted to be another term for the same referent. At 2;2.0 we have *Baby on sama kuin vauva* ('Baby is (the) same as vauva'), with what was probably non-immediate recall of both words, and the referent, a toy-baby, is again physically present. The correspondence is here expressed by 'same as', which has a precursor in a remark which I referred to earlier, made at 1;11.16: *Tutti se on samalainen, tutti on samanlainen kuin lupsu* ('Comforter it's the same; comforter is the same as dummy'). Here the referent is thematic but fully explicit, since it is referred to by the word 'same' (on one interpretation), or (on an alternative interpretation) 'is the same' is a verbally more explicit way than 'is' of expressing the relation between the referent and its name. On either interpretation, language acquisition can be seen to have progressed so as to enable the child to construct the reference relation first in L1, and then via each language in the other, while the acquisition of the pronouns (it and se) enable

her to explicitly indicate the thematised referent. At 2;2.26 there are some self-repairs which indicate explicit awareness of the referents of verbs, but I will omit these and turn to the next noun example, which occurs at 2;2.3 when, again at mealtime, and in the presence of the referent, she explains to her English grandmother *Lautanen, that's plate*. This is on the pattern of 'Kaulin... se on rollingpin' but lacks the hesitation pause. She is now able to align corresponding L1 and L2 words where the correspondence has not been pointed out to her and where the referent is physically present. At 2;3.8, translates a two word phrase for her grandmother in a kind of self-repair: *I mean sukkia: no socks*. The L1 and L2 word are co-ordinated through the referent, but there is as yet no unambiguous evidence that she is relating the L1 and L2 word directly to each other, such that she would be thematising the word itself.

At this point, implicit precursors of thematisation of the word begin to occur. At 2;5.12 the following dialogue occurs:
Anna: *Peter's train* (the toy referent is physically present)
Father: What is it like?
Anna: *Veturi*.
She gives a Finnish equivalent for train, and thus she has understood "is like" to mean "is the same as". Here the father thematises the referent, and her own use of the words *train* and *veturi* are both comments. Thus in this realisation of the reference relation she does not thematise either the referent or the word. At 2;7.26 she says *A bowl* with reference to a picture of a soapdish, but she is hesitant about the identification. Her

father replies, "It is a bowl. It's called a soapdish really". She responds *I call it*. What is important here is that the act of referring is made explicit by the word "call", which must be have been acquired from input of the form "Mummy calls it X, Daddy calls it Y". (The omission of "bowl" after ditransitive "call" is doubtless syntactic transfer from Finnish).

The remark about the soapdish was preceded by a remark at 2;3.21, where she said *Menisi kerhoon - Playgroup I mean* ('One would go to the Club - Playgroup I mean') where *I mean* makes explicit the act of replacing (or repairing) the L1 noun with the L2 noun. Here the speaker, and not the referent, co-ordinates the L1 and L2 nouns. Thus the statement of the reference relation has progressed from a semantic to a functional statement, and it will shortly progress to a structural statement. That is to say, her implicit understanding proceeds from the relation between object and word, to the relation between user and word, to the relation between word and word.

From 2;5 onward, expressions making explicit the membership of a word in a language occur. The first is her translation of a Finnish word as *Grin in English* at 2;5. Then at 2;10.2 her father asks her "Do you know what "lid" is in Finnish ?", to which she hesitantly replies *Kansi, I think*. Thus the membershipping phrase of the form "In L" has been acquired. At 2;10.15 she says. *This is /bits/. Me and Mummy says /bits/ in English. What do Mummy and I say in Finnish?* So the phrase "in L" is now fully productive. What is important is that this phrase makes it possible to

thematise a word while asking for its equivalent in the other L. It seems likely that the phrase was actually necessary for this step to be taken, for how else could she have distinguished between person and language? ("What do Mummy and I say in L?") And precisely this separation of person and language makes it possible to refer implicitly to the word, as distinct from referring implicitly to the referent.

Finally, at 3;3.26, thematisation of the word becomes explicit, when she says: *London means Lontoo. Means the same.* It is unambiguously clear that here she thematises the word and not the referent, because *mean* is itself a theme in the second part of the utterance and the identical referent is focussed in *same*. A paraphrase of this remark would be: "London and Lontoo both refer to the same thing." It is worth observing that the similarity of form between the English and Finnish names could explain the salience of this particular correspondence. I referred earlier to a similar example with regard to synonymy. Other input may also have contributed to this advance. About one month before her remark about London her father had initiated a game which they played together and in which she invented word forms (as she was apt to do at this time), and her father provided a referent for each, also deciding whether they were English or Finnish.

The second occasion on which a word was thematised was a rare instance of the recognition of intralingual synonymy, when at 3;4.23 she said to her father: *No means none*. The third occasion concerns an autologism. At 3;8.5 she asks: *Mikä on*

/ləʊgən/ suomeksi? ('What is /ləʊgən/ in Finnish?') and *Sinnikukka e o nimeä englanniksi, mutta mä koetan miettiä sille nimeä* ('Sinnikukka isn't a name in English, but I'll try to think of a name for it'). This is not the first time she has used the word 'name', but it is worth noting that this example is not a fully explicit expression of the concept of reference which I am claiming she now possesses. A less autologistic example occurs at 3;9.2 when she asks about a self-made compound: *Is the gutterfloor anything mummy?* Clearly, the word 'gutterfloor' is thematised, since, firstly it does not have an actual referent and secondly, the possible referent is indicated by the word 'anything'.

In conclusion we can say that this child's concept of the relationship between the linguistic sign and its referent, at the end of the period studied, is much like that of the early Wittgenstein (Wittgenstein 1922)[2]. She conceives of meaning as a relation between word and object. There is no evidence of her developing as yet anything like the concept of Saussure, that is, the concept of meaning as a relation between concept and sound (acoustic image). Perhaps there is nothing necessarily surprising about this. There is as yet no evidence that she thinks that new meanings can be indicated in any other way than by ostension, and it is not until a remark at 6;1.20 that there is a beginning of the recognition of functors, when she says after a discussion with her mother (i.e. relevant input) about the teaching of Finnish to English speakers without using English: *Miltä näyttää joo ja miltä näyttää ei?* ('How can you show yes and how can you

show no?').

Awareness of the distinction between word and referent is evidenced by a number of her remarks. Clearly she knows that the word is not part of the referent, unlike Piaget's (monolingual) subjects of twice this age (Piaget, 1929). At 3;7.20 she finds it amusing that the word train might be written on the object itself, and at 4;1.3, when told that the Finnish 'piimä' does not have a name in English because you cannot buy it in England, she retorts (although inappropriately): *You don't buy names.* In Peircean terms, she conceives of meaning as symbolic, but not as indexical or iconic (Peirce, 1960)[1]). At 3;6.5 she plays at deforming a word and refers to this word as 'a word'. At 3;11.3 she announces: *It's all mashed up. It's ri'pel. I have very funny names because I can't think of anything else.* and on the same day: *Take it from the you know. That's a nice name, 'you know'.* This autologistic play doubtless entails an implicit concept of word as object, but the concept has not explicitly appeared even by the sixth year (cf. Bowey and Tunmer, 1984).

Awareness of Face-to-Face Discourse Structure

Interesting development occurred in explicit references both to face-to-face and voice-to-voice (telephone) discourse. Awareness of face-to-face discourse first became apparent during an episode of play with plastic figurines, which clearly represented conversational participants. At 2;4.17 there were explicit references

in L2 to speakers versus non-speakers, to competence in talking, setting, dyadic versus polyadic CHECK conversation, and to addresser versus addressee. At 2;6.5 the dyad as such was referred to, as well as the non-verbal aspect of posture. At 4;3.9 mode of address was mentioned. All the above explicit references were contextualised in play, and this distinguishes them sharply from the expression of linguistic concepts discussed in preceding sections. Later than most of these examples are a number of manifestations implicit in imitative play: at 2;10.7 a greeting ritual was played, and an imitation of the familiar dialogue pattern consisting of elicit, respond and follow-up moves (A: *Have a good time? B: Oh yes I did. A: I thought you would)*. Third party direction of conversation occurred in play, and at 3;3.26 the role of overhearer was specified, and was referred to implicitly at 3;1.6 *(I heard what daddy said to mummy)*.

The understanding of discourse processes must also include awareness of acts of speaking and acts of correcting or repairing speech. Space does not permit our discussing the data on repairs. As regards acts of speaking, it is notable that examples of "speech act" verbs such as ask, bet, promise, tell, are not found in the record. On the other hand, references to acts of speaking with *say, talk, hear, mean,* number at least two dozen. Such acts are both reported (suggesting more implicit awareness) and referred to (suggesting more explicit awareness). References to her own speech, in connection with addressee and in connection with topic, occur at 2;6.7 and at 2;8.18 respectively, without

any reports as precursors. In fact, *I was talking to X* was followed, not preceded, by the more implicit *I said to X "Don't drink". "No." I said "No."* occurs at 2;5.19 and *"I said "yes."* at 2;7.18, but, as indicated above, reference to the corresponding speech acts of denying, refusing, agreeing, or the like, does not occur; presumably the caregivers themselves rarely referred to such acts. The act of naming however was explicitly referred to at 3;3 with the phrase *to call with a name*, and this had numerous variably implicit precursors, such as *Bus it call* (2;4.16), *Blue I meant to say* (2;5.13), *They haven't got a name, no.* (2;7.22), *I suddenly forgot its name* (2;4.19). Between 2;8.11 and 3;9.8 there are 8 examples of direct quotation of own or others' real or imaginary speech, the last of which combines direct speech followed by reporting: *"Woof Ye". He said first 'Woof' and then 'Ye'.* The remaining references to acts of speaking have no specific implicit precursors. Three examples indicate reflective comparison; at 3;4.11: *You said X but I thought you said Y. I get them* (i.e. two similar words) *mixed up.* And at 3;12.24: *I used to say X but now I say Y* (a difference of pronunciation); also, at 4;1.15 *I've learned to say X* (an idiom). A fourth example shows anticipation: *That's what I thought you would say.*

Summarising, we may say that the concept of an "act of speaking" at this point in time has two aspects: naming something and saying something. By the start of the fifth year, "something said" is detached from context (is remembered and anticipated) and form and content of speech are distinguished. As I have

pointed out elsewhere in this paper, this separation may be a necessary condition for the emergence of syntactic awareness, although it appears not to be a sufficient condition.

Part 2: Discussion

Explanation

I propose now to consider how the findings of this study, described above, can be explained, both in general and in particular.

In general terms, we must ask: What is the background against which the concepts of language and language behaviour emerge? More particularly, we would like to explain both why certain concepts are salient and/or explicit while others are poorly represented and/or implicit.

The Concepts of Semantic Relations

The relatively limited development of the concepts of the major types of semantic relation would be necessarily conditioned by the relative abstractness of meaning as compared with form, and thus by the general level of cognitive development. In this regard, we notice that homonymy is fully and explicitly understood by 4;7, while its converse, synonymy, is not referred to explicitly at any point during the period studied. From the child

language user's viewpoint, there is an obvious difference between these types of relation. In grasping a homonym, the child is able to solve a certain problem, that of distinguishing two meanings in one word-form. On the other hand the proper grasp of a synonym might actually create a problem, that of possessing two word-forms and not knowing which to use in a given meaning. Furthermore, it is likely that the child rarely encounters clear examples of synonymy. As regards antonomy, the absence of this concept (the converse of synonymy), may likewise reflect the absence of any presenting problem the solution to which would result in such a concept. Hyponymy has been discussed in Part 1.

The Origin of the Concept of Minimal Distinctiveness

The scope of this article does not permit a full discussion of all the observations reported in Part 1. I have chosen for extensive treatment the concept of minimal distinctiveness because of the relative richness of the data in this area. This richness suggests that a variety of problems arose from the acquisition of phonology in L1 and L2, and this is borne out by the analysis.

The presentation of the above data points (Figure 1) is organised as a binary branching tree with the usual interpretation as a taxonomic hierarchy. POSITION FIGURE 1 OPPOSITE THIS PAGE Too much should not be read into the fact that the data points can be arranged in this way. If different data had presented itself,

a hierarchical arrangement could still have been possible: natural classes of sounds can form a number of distinct hierarchies (cf Halle 1959:34; Pickering 1990:63). What the hierarchy demonstrates is that the set of contrasts registered by the child corresponds to at least one phonologically relevant ordering. Other equally satisfactory orders could have occurred.

In Figure 1, the items are shown followed by the age of occurrence in years and months. The numbers on the left are the branching points of the tree from root to leaf, and the number (priority in numbering is of top to bottom over left to right) is followed by the phonological class label in capitals. The @ follows an autologism.

Inspection of the ages shows that, on the interpretation of the features and their interrelationship in Figure 2a, the following hierarchy obtains:

L1 < L2; -syllable initial < +syllable initial; C < V (one exception is placed in parentheses); V quantity < V quality; voice (in velar and alveolar stops) < continuant (in alveolars).

This hierarchy is indicated by the directed branches on the tree diagram, Figure 2a. Thus there is a developmental sequence in the growth of awareness, expressed by this hierarchy. Certain explanations suggest themselves. L1 as the mother's language and that of the primary care-givers precedes L2, the father's

language. Syllable initial sounds are dealt with before syllable internal or final sounds in L1 (but not in L2, where this distinction does not emerge), perhaps because they are more prominent perceptually. Consonants, as requiring contact between articulators, are more accessible to proprioception than are vowels. Voice is more fundamental than continuance in consonantal sounds. Alveolars are more frequent than velars, and, in Finnish, both are more frequent than labials (Karlsson 1982). It is not clear to me however why vowel quantity should have precedence over vowel quality (in L2); however, the interval between them is relatively short.

It is further possible to view the minimal contrasts through a linear tree representing a scale of contrasts along the parameters of sonority or aperture. The scale in Figure 2b is the best possible for the contrasts found in our data (non-occurring phonemes in parentheses). POSITION FIGURE 2 OPPOSITE THIS PAGE

The tree constructed on this scale is non-branching or "linear" and immediate neighbours are minimally distinct. It will be seen that only two contrasts found in the data can be expressed on this tree: s/h, and r/l. Thus, the child appears to have conceptualised binary and hierarchical rather than non-binary, non-hierarchical distinctions at the earliest stage in the acquisition of phonology.

It is possible to attribute almost all the contrasts in the data to problems with intralingual or interlingual discrimination.

Intralingually, /s/ and /h/ are auditorily rather similar because /h/ may be fricativised, and both occupy initial and medial word positions; they are also related diachronically. There is dialect difference between [d] (a flap) and [r] a trill, corresponding to a difference between the mother's dialect and the dialect of other caregivers. On the other hand, the phoneme /d/ is marginal in L1 (word medial and only in derived forms) but found in all positions and in roots in L2. Vowel length varies independently of quality in L1 and is phonemic, but varies with quality and is not phonemic in L2. The phonetic interplay of consonantal voice and vowel length in L2 is also lacking in L1. The consonants /f/ and /g/ are marginal (foreign or in remote dialects) in L1 but found frequently in all positions in L2; /r/ occurs word finally in L1 but not in L2. The problems with r/l appear to be the universal difficulties which lead to metathesis diachronically and in adult speech errors. Furthermore, the data contains almost all the interlingual differences which could in principle give rise to difficulty in distinguishing phonemes; the only obvious absences are p/b (L1 has only marginal /b/) and the front rounded vowels /ö/ and /y/ of L1, not found in L2. The preponderance of **inter**lingual cases is of course a distinctive contribution of bilingualism.

The above analysis of the data on minimal contrast awareness, besides indicating a clear developmental sequence, leads us to another, and at first sight, more surprising conclusion. The above table contains only the occurring minimal contrasts between sounds which had features other than consonantal, vocalic, voice,

and continuance, in common. It is remarkable that this set contains all but 6 of the 28 contrasts which have been found in the data. The remaining 6 are:

1;6 haukku paukku (L1)

2;3 silitysvauva @ (v silitysrauta) (L1)
(i.e. smoothing baby v smoothing iron: the latter is implicated, but was not said)

3;4 day zay @ may lay kray @(?) (L2)

3;8.4 tummy v mummy

3;8.5 mɔ bɔ sɔ lɔ

5;0 balloon v baboon (L2)

These can be interpreted as phoneme contrasts, but all the others are, primarily, feature contrasts. Thus, while implicit phonemic awareness is found right from the earliest speech, most awareness is of minimal feature contrasts. Why is this? I propose two convergent explanations. Firstly, as we have seen above (4.3), awareness of words as objects does not develop during the period studied. It is plausible therefore to think that if the child is aware of the formal properties of speech - of the sound as distinct from the meaningful function - she will be aware of them as properties of parts which are usually meaningless, for example, syllables. One of the 4 examples above shows that this was the case at 3;4. Minimal phonemic contrasts, however, are (at least intuitively: see Pickering 1990:32,42) defined on word domain. Secondly, and much more importantly, the awareness of feature contrasts is motivated by the acquisition process. During

the period in which the implicit awareness of these contrasts appears, the child is primarily occupied in acquiring the phonology of both languages.

During the process of acquisition, various problems may arise. These problems concern, not boundaries between words, but boundaries between phonemes, which are, in effect, features. The problems will be either internal to one of the languages or else arising from the contact between them; or perhaps even from both sources. This scenario is consistent with Lindblom's interpretation of his experimental studies on the construction of the phoneme. Lindblom (1989) writes: "Psycholinguists assume that unless the child, as it were, "discovers the phoneme" as the building block of the lexicon it will not be able to develop a vocabulary of normal large size. In the computational experiments I have reported the phoneme is **not discovered** (Lindblom's emphasis). Rather, minimal pairs identify nodes of "gestural overlap" And further: "The simulated phoneme is accordingly not the cause of a large vocabulary. It is a result of the vocabulary growth... The process is automatic. It occurs in a completely self-organizing way as it seems to do in the normal child." These remarks are in exact accord with my hypothesis that awareness is a byproduct, not a means, as claimed in Ben Zeev (1977). The data analysis presented in the tree diagram above shows that awareness resulting from the problem of defining boundaries between speech sounds will *automatically* result in the construction of the phonemes, if minimal word pairs, when these enter awareness because of a further problem - see below - are considered to

present a ceiling to the degree of similarity between sounds which can appear to the child as problematic.

As regards the further problem, I suggest that two of the examples above of phonemic contrast are motivated by the conflict between semantic acceptability (meaningfulness) and unacceptability (meaninglessness), on the one hand, and equal formal acceptability of L2 words (day, zay etc. at 3;4) and by the conflict between similarity of form and disparity of meaning (the humorous: balloon, baboon, at 5;0) on the other hand. While /d/ and /z/, and /b/ and /l/ have not presented problems of phonetic discrimination earlier, here they appear (somewhat randomly) in problems due to an underlying discrepancy in the form-meaning relation which the child now encounters for the first time. The rhyming words and syllables occurring at 3;8 suggest an implicit awareness of the C/V distinction, perhaps arising from the problem of distinguishing between meaningful and meaningless rimes. I have shown above that the earliest evidence that our subject is aware of the distinction between word and referent occurred at 3;3.26. I have maintained that this awareness does not imply any awareness of words as objects, with specific qualities of their own. However, from at least as early as 3;3 there is a sensitivity to word form, represented implicitly by, among other things, remarks that words belong to or resemble particular languages e.g. "orang utan is like Swedish" at 3;3. Chaney (1989) has found by experimentation that word segmentation is achieved with 60% success by monolingual children aged between 4;5 and 5;0. We have no evidence of

spontaneous awareness concerning word boundaries, however (cf the almost total absence of spontaneous awareness of syntactic phenomena in our observations). As indicated above, we have only a little, but nevertheless clearcut, evidence of the awareness of minimal word pairs from this period.

I would maintain that what can be elicited experimentally, with or without special training of the subjects, belongs to a different strand of development from that which can be learned by observation alone. Experimental elicitation engages the child in a socialisation process, whereby operationalised concepts related to the learning of skills are detected. But these concepts have not necessarily been already attained by the child in the solution of problems that arise in the course of acquisition.

The experiments certainly tap covert knowledge. Yet, the operationalised concepts differ in several ways from the concepts we have been studying. Firstly, they result from externally stimulated reflexion, and not from reflexion which arises automatically through internal stimulation by a presenting problem. Secondly, such concepts are defined by the experimenter from a perspective which is both explicit and adult. The child's awareness is thereby defined as either present or absent (explicitly), rather than as approaching the concept through decreasingly implicit stages (although if a phenomenological analysis of the experiment is done, it may provide some knowledge of stages), and the institutionalised adult form of the concept,

e.g. that a word is an orthographic word with a linear structure and an arbitrary sound-sense relationship, is used, rather than, as with us, an investigator's preliminary sketch, based upon longitudinal data.

The Role of Bilingualism

I would suggest that bilingualism was an initial (non-necessary) condition for concept formation in three respects. Firstly, the majority of phonological distinctions can be derived from interlingual discrimination problems. Secondly, the occasions for the emergence of the concept of reference and the relation between word and referent were all bilingual. Thirdly, the background for the child's interest in morphology appears to be the lack of a transparent correspondence of the word level structures of L1 and L2 which would have permitted the application of the one to the other. Ben Zeev (1977) hypothesised that bilinguals develop an analytic strategy as a means of overcoming interlingual interference. Yet, notwithstanding an occasional piece of analysis such as that described in 4.2 above, our subject did not on the whole manage to avoid interlingual interference at the morphological level. My own hypothesis is that analyses (i.e. instances of linguistic awareness) develop, not as the solution to a general problem (of which it may not have been demonstrated that the child is aware) but as solutions, or at least byproducts, of specific perceived problems which themselves arise because of difficulties in discrimination.

I cannot detect other aspects of awareness which appear to have been dependent upon bilingualism, other than the obvious one, in the language behaviour area, concerned with the distinction as to who uses which language, which has not been dealt with in this article. It seems clear that the relative salience of phonological awareness and the complete absence of syntactic awareness must be explained in some other way. What might explain the absence of syntactic awareness is the hypothetical (necessary but not sufficient) condition that the linguistic sign as such enters awareness only if it is first detached from its referent. Clearly, this detachment occurrred in the case of word and referent, but did not (overtly) occur in the case of utterance and referent, at least where the utterance consisted of more than one word. It is also possible that the acquisition of syntax does not give rise to problems, surprising as this may seem when a child is simultaneously acquiring a predominantly agglutinating and a predominantly isolating language. Slobin (1975) argues that a child does not need to rely on syntax to understand referential meaning: rather, syntactic complexity has an expressive function. Slobin and Johnston examined transcripts of adult input to nchildren between 2 and 5 years of age and found no instances which could have been misinterpreted through lack of syntactic knowledge (Slobin 1977:210). We can therefore surmise that the absence of syntactic awareness in our subject is to be predicated on a lack of problems with the expressive function. Since no specific data on pragmatic development were collected, it will not be possible to pursue this line of inquiry systematically. Of course the child did acquire more than minimally simple

syntax, doubtless because, as Slobin also remarks, the child simply cannot help paying attention to and assimilating grammatical detail. On our hypothesis, this syntactic acquisition could well lead to covert awareness, but would not give rise to overt remarks.

Limitations of the Study

The most important limitation of the present study is the absence of complete data on relevant input, which, had it been available, could have performed a further explanatory role, along with the correlative information that particular input had been lacking. In particular, one would like to know whether the explicit appearance of a concept follows occasions on which the child acquires appropriate words with which to express it. Equally interesting would be further knowledge of the process whereby the child stimulates the caregiver to supply needed words for the expression of concepts which are in process of formation. A second limitation, which may have had some influence on the record in the present study, is that much of the L1 data was, unavoidably, collected by a second observer, whose identification of metalinguistic data may have been based in perceptions slightly different from those of the author. The coherent picture emerging from the data analysis however militates against our attaching great importance to observer differences in this case study. One may also add that interaction with other children, even though there were no siblings in this case, might have

supplied some marginally useful additional observations, since it is known that (e.g.) social language play occurs between young children.

Role of Method

There is, obviously, a definite limitation due to the choice of an observational method, in that covert yet spontaneous processes of concept formation, if they should lack opportunities for expression, would go undetected. Nevertheless, it seems very likely that, given spontaneous interest in an aspect of language or language behaviour, that relevant opportunities for its expression would have occurred, in the case studied here. I would even go as far as to suggest that opportunities for the formation of a concept and for its expression are correlated with each other; without wishing to deny that covert awareness exists. Discussion of the nature of overt and covert concept formation is however beyond the scope of this article.

Concluding Summary and Homology with Cultural History

In summary, we may say that overt linguistic awareness in a pre-school child, as defined by behaviourally manifest concept attainment without any programme of elicitation or instruction, is considerable, at least in the present case of an intelligent female bilingual acquiring typologically different languages. The

foci of awareness in the area of grammar and phonology are the word and the distinctive feature, respectively; in the area of discourse, the focus is on conversational interaction. The most focussed semantic relation is homonymy. Word is sharply distinguished from referent and the meaning of a word is conceptualised as its corresponding object. There is only implicit awareness of synonymy and none at all of antonomy. Syntactic awareness is completely absent. Explanations of the lacunae are diverse; in general, the data is consistent with the hypothesis that spontaneous concept formation is a byproduct of perceptual and cognitive discrimination problems. Biligualism contributed directly to concept formation in the areas of phonology, morphology and the distinction between word and referent.

The evident homology with the cultural-historical development of linguistic concepts confirms, in the areas of phonology and lexis at least, Piaget's observation that ontogenesis reverses the order of history: in this study, implicit awareness of phonological features clearly preceded implicit awareness of phonemes; historically, the phoneme concept - especially the implicit concept presupposed by alphabetic scripts - clearly precedes the concept of the phonemic feature. Similarly, the concept of a symbol, in the sense of Peirce, appeared without having been preceded by concepts of index and icon, implicit awareness of which we know from the history of signs - though not specifically of speech - to antedate symbolic awareness.

Footnotes

1 Peirce wrote: "an analysis of the essence of a sign... leads to a proof that every sign is determined by its object, either first, by partaking in the character of the object, when I call the sign an Icon; secondly, by being really and in its individual existence connected with the individual object, when I call the sign an Index; thirdly, by more or less approximate certainty that it will be interpreted as denoting the object, in consequence of a habit (which term I use as including a natural disposition), when I call the sign a Symbol". (This is Pierce's later formulation; earlier (1867), he used a different set of terms.)

2 Wittgenstein wrote: "Der Name bedeutet der Gegenstand. Der Gegenstand ist seine Bedeutung (p. 46 - 3.203)" and "Die Gegenstände kann ich nur n e n n e n. Zeichen vertreten sie. Ich kann nur v o n ihnen spechen, sie a u s s p r e c h e n kann ich nicht (p.49 - 3.221)". Also: "Die Forderung der Möglichkeit ist die Forderung der Bestimmtheit des Sinnes" (p.48 - 3.23). It is well-known that Wittgenstein later changed his view of language and meaning.

Figures

1 SYLLABICITY --> 2 6
2 -SYLLABLE INITIAL AND L1 --> 3 5
3 CONSONANT: +SONORANT +LIQUID --> 4
4 +TRILL v -TRILL @ furska v pulska 2;10
(manna v manner 4;6)
5 VOWEL: +LONG v -LONG (=SHORT) ve:ttä v vettä 5;2
6 +SYLLABLE INITIAL AND L1 --> 7 15
7 CONSONANT --> 8 11
8 CONSONANT: +SONORANT +LIQUID --> 9 10
9 +TRILL v -TRILL (=lateral) orava v. ovala 1;10
10 +TRILL (metathesis) orava v ovara @ 1;10
11 CONSONANT: -SONORANT -LIQUID (=GLIDE) --> 12 13
12 +GLIDE v -GLIDE Elina v. elija v linja 1;8
13 -GLIDE: -CONTINUANT v +CONTINUANT haukku v paukku 1;6
14 +CONTINUANT: -SIBILANT v +SIBILANT iho v iso 2;2
handals @ v sandals 2;2
15 VOWEL: HIGH FRONT v MID FRONT i -i-isi v E-e-e-va 2;1
16 L2 --> 17 18
17 CONSONANT --> 19 f-f-few 5;4
18 VOWEL --> 25
19 CONSONANT: +CONTINUANT v -CONTINUANT --> 20 21
20 +CONTINUANT: -SIBILANT v +SIBILANT feeling v ceiling 5;4
21 -CONTINUANT: +ALVEOLAR v -ALVEOLAR --> 22 23
22 +ALVEOLAR: +VOICE v -VOICE tummy v dummy 2;7
poodle v pootle 3;1
teddy v tetty @ 3;2

delve v twelve 3;2

23 +ALVEOLAR: +CONTINUANT v -CONTINUANTraisins v todaysins @4;4

24 -ALVEOLAR (=velar): +VOICE v -VOICE game v came 3;8

25 QUANTITY v QUALITY --> 26 27

26 QUANTITY:SHORT/MONOPHTHONG v LONG/DIPHTHONGpepper v paper4;8

ye:s v yɛs 4.11

27 QUALITY: PERIPHERAL (=colour) v CENTRAL (=absence of colour)

crocker v croco 5;0

nɔʊ v nəʊ 4;11

bus v bʌs 4;11

28 HIGH FRONT v MID FRONT pepper v paper 4;8

Figure 1 Phonological hierarchy: binary features. Data points are shown on the right, followed by age of occurrence.

Figures

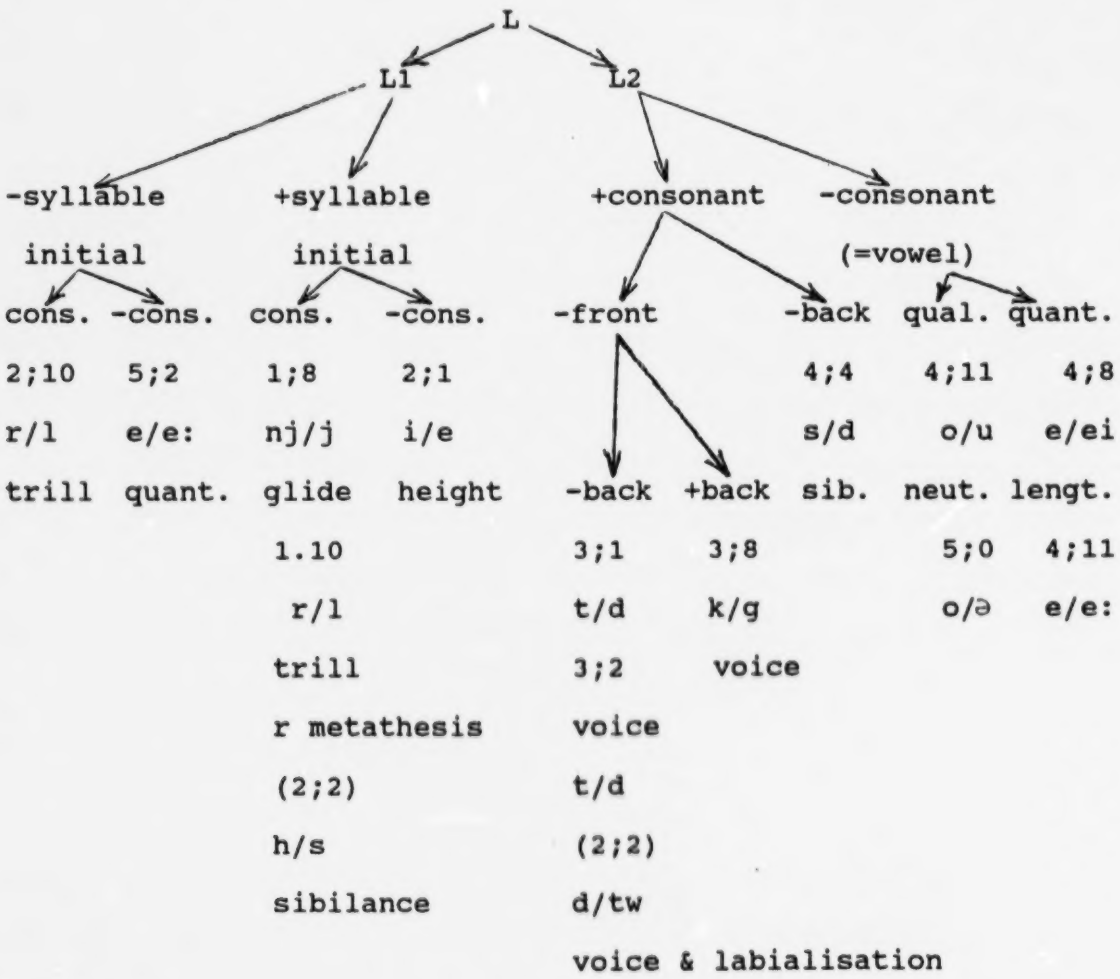

Figure 2a Developmental hierarchy (read L-->R and top-->bottom). Contrasting phoneme and feature shown below age at which awareness of the linguistic concept is inferred from an implicit or explicit remark.

p t k d g f s h (m) n r l (v) j i (y) u o e ə (ö) (ä) a

Figure 2b Phonological hierarchy: parametric scale. See text.

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